IN THE CLAIMS

Applicants respectfully request that the claims of the above-identified application be amended so as to read as follows:

1. (Previously Presented) An optical pickup projecting a collected beam onto a recording surface of an optical storage medium to retrieve recorded information by means of an intensity of reflection from the recording surface, said pickup correcting a first spherical aberration in an optical system by producing at correcting means a second spherical aberration which cancels the first spherical aberration,

said pickup being characterized in that:

the correcting means is capable of producing at least two second spherical aberrations of different magnitudes by means of a collected beam spot on the recording surface of the optical storage medium so that the magnitudes are 1/4 or more of a wavelength λ in differences between maximum of measurement values and minimum of the measurement values or 1/14 or more of a wavelength λ in standard deviation; and

said pickup comprises control means which: causes the correcting means to produce the at least two second spherical aberrations of different magnitudes; calculates an optimal magnitude of aberration correction for the first spherical aberration through a numeric evaluation based on an evaluation value of a reference signal obtained by receiving reflection of intensities in the presence of the spherical aberrations of such magnitudes; and controls the correcting means to carry out correction using the optimal magnitude of aberration correction.

2. (Original) The optical pickup as set forth in claim 1, wherein

in the numeric evaluation, the control means calculates an approximation curve from the at least two second spherical aberrations of different magnitudes produced by the correcting means and the evaluation value for these second spherical aberrations and designates a peak or bottom position of the approximation curve as the optimal magnitude of aberration correction.

3. (Original) The optical pickup as set forth in claim 2, wherein

the approximation curve is a multiple term approximation curve.

4. (Previously Presented) The optical pickup as set forth in claim 1, wherein

the control means:

causes the correcting means to produce the two second spherical aberrations of different magnitudes so that the two second spherical aberrations are separated by 1/2 or more of a wavelength λ in differences between maximum of measurement values and minimum of the measurement values and that the second spherical aberrations have substantially equal evaluation values;

calculates a mean value of the two magnitudes of the spherical aberrations as the numeric evaluation; and

uses the mean value obtained in the mean value calculation as the optimal magnitude of aberration correction.

5. (Previously Presented) The optical pickup as set forth in claim 1, wherein

the control means:

causes the correcting means to produce a second spherical aberration of a first magnitude and a second spherical aberration of a second magnitude which is separated by 1/2 or more of a wavelength λ in differences between maximum measurement values and minimum of the measurement values from the second spherical aberration of the first magnitude so that the second spherical aberration of the second magnitude can produce a reference signal having an evaluation value substantially equal to that of a reference signal obtained in the production of the second spherical aberration of the first magnitude;

calculates a mean value of the second spherical aberrations of the first and second magnitudes as the numeric evaluation; and

uses the mean value obtained in the mean value calculation as the optimal magnitude of aberration correction.

6. (Original) The optical pickup as set forth in claim 1, wherein

the correcting means includes:

a liquid crystal panel containing a circular band of transparent electrode provided on a liquid crystal layer filled with birefringent liquid crystal; and

a liquid crystal drive circuit applying to the transparent electrode voltages corresponding to the at least two second spherical aberrations of different magnitudes.

7. (Original) The optical pickup as set forth in claim 1, wherein

the correcting means is a beam expander including a pair of lenses and capable of producing the second spherical aberrations by varying a distance between the lenses.

8. (Original) The optical pickup as set forth in claim 1, wherein

the correcting means is positioned on an optical path along which the beam projected onto the recording surface of the optical storage medium and the reflection from the recording surface travel.

9. (Original) The optical pickup as set forth in claim 1, wherein:

the control means:

causes the correcting means to produce a second spherical aberration of a first magnitude and a second spherical aberration of a second magnitude so that the second spherical aberration of the second magnitude can produce a reference signal having an evaluation value substantially equal to that of a reference signal obtained in the production of the second spherical aberration of the first magnitude;

calculates a mean value of the second spherical aberrations of the first and second magnitudes as the numeric evaluation; and

uses the mean value obtained in the mean value calculation as the optimal magnitude of aberration correction; and

the first and second magnitudes are smaller than a maximum signal amplitude by 5% or more.

10. (Original) The optical pickup as set forth in claim 1, wherein:

prior to adjustment of a focus offset, the control means:

causes the correcting means to produce a second spherical aberration of a first magnitude and a second spherical aberration of a second magnitude so that the second spherical aberration of the second magnitude can produce a reference signal having an evaluation value substantially equal to that of a reference signal obtained in the production of the second spherical aberration of the first magnitude;

calculates a mean value of the second spherical aberrations of the first and second magnitudes as the numeric evaluation; and

uses the mean value obtained in the mean value calculation as the optimal magnitude of aberration correction; and

the first and second magnitudes are smaller than a maximum signal amplitude by 10% or more.

11. (Original) The optical pickup as set forth in claim 1, wherein

the reference signal is an information signal read from the recording surface of the optical storage medium, and an evaluation value of the reference signal is an amplitude level.

12. (Original) The optical pickup as set forth in claim 1, wherein

the reference signal is a tracking error signal, and an evaluation value of the reference signal is an amplitude level.

13. (Original) The optical pickup as set forth in claim 1, wherein

the reference signal is an information signal, and an evaluation value of the reference signal is jitter.

14. (Original) The optical pickup as set forth in claim 1, wherein

the reference signal is an information signal, and an evaluation value of the reference signal is an error rate.

15. (Previously Presented) A method of correcting a spherical aberration of an optical pickup,

said method correcting a first spherical aberration in an optical system by producing a second spherical aberration which cancels the first spherical aberration when the pickup projects a collected beam onto a recording surface of an optical storage medium to retrieve recorded information by means of an intensity of reflection from the recording surface,

said method being characterized in that it comprises the steps of:

producing at least two second spherical aberrations of different magnitudes

by means of a collected beam spot on the recording surface of the optical storage medium so that the magnitudes are 1/4 or more of a wavelength λ in differences between maximum of measurement values and minimum of the measurement values or 1/14 or more of a wavelength λ in standard deviation;

calculating an optimal magnitude of aberration correction for the first spherical

aberration through a numeric evaluation based on an evaluation value of a reference signal obtained by receiving reflection of intensities in the presence of the spherical aberrations of such magnitudes; and

correcting the first spherical aberration using the optimal magnitude of

aberration correction.

16. Canceled, without prejudice.

17. Canceled, without prejudice.

18. Canceled, without prjudice.

19. Canceled, without prejudice.

20. Canceled, without prejudice.

21. Canceled, without prejudice.

22. Canceled, without prejudice.

23. Canceled, without prejudice.

24. Canceled, without prejudice.